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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/511,047

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EXAMINER

LAU, JONATHAN S

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/511,047	<b>Applicant(s)</b> RAVANKO ET AL.	
	<b>Examiner</b> Jonathan S. Lau	<b>Art Unit</b> 1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,5,6,8-16,18,19 and 22-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,8-16,18,19 and 22-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

This Office Action is responsive to Applicant's Amendment and Remarks, filed 12 Mar 2008; in which claim 7 is cancelled, claims 1, 18 and 19 are amended to change the scope and breadth of the claim, and new claims 20-25 are added.

This application is the national stage entry of PCT/ EP03/01091, filed 04 Feb 2003; and claims benefit of foreign priority document FINLAND 20020675, filed 09 Apr 2002; the certified copy of this foreign priority document is in English.

Claims 1, 5, 6, 8-16, 18, 19 and 22-25 are pending in the current application.

### ***Rejections Withdrawn***

Applicant's remarks, filed 12 Mar 2008, with respect to the rejection of claims 1 and 5-21 35 under U.S.C. 112, second paragraph, as being indefinite have been fully considered and found to be persuasive to remove the rejection as the terms "more than 65 weight %", "over 85 weight %" and "90 to 96% or more" are not found in the claims and the metes and bounds of the ranges as claimed would be understood by one of skill in the art.

Therefore the previously stated rejection is **withdrawn**.

Applicant's amendment, filed 12 Mar 2008, with respect to the rejection of claims 1, 5-16 and 18-19 under 35 U.S.C. 112, second paragraph, as being 35 U.S.C. 103(a) as being unpatentable over Heikkila et al. (US Patent 6,572,775, of record) in view of

Masuda et al. (US Patent 5,391,299, of record) has been fully considered and found to be persuasive to remove the rejection because claim 7 is cancelled and the amendment to claim 1 changes the scope and breadth of the claim to require a cation exchange resin with a degree of crosslinking of 2 to 4.5%.

Therefore the previously stated rejection is **withdrawn**.

The following new grounds of rejection are necessitated by Applicant's Amendment, filed 12 Mar 2008; in which claim 7 is cancelled, claims 1, 18 and 19 are amended to change the scope and breadth of the claim, and new claims 20-25 are added. Claims 5, 6 and 8-16 depend from claim 1 and incorporate all limitations therein, including the amended limitations changing the scope and breadth of the claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5, 6, 8-10, 13-15, 18, 19, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heikkila et al. (US Patent 6,572,775, of record) as evidenced by Scott et al. (US Patent 5,348,871, issued 20 Sep 1994, cited in PTO-892) in view of Catani et al. (US Patent 5,988,177, issued 07 Dec 1999, cited in PTO-892) and in view of Masuda et al. (US Patent 5,391,299, of record).

Heikkila et al. discloses a method for fractionating a solution into two or more collected fractions by a chromatographic simulated moving bed process. (Abstract). Heikkila et al. discloses Finex CS 13 GC, a polystyrene matrix crosslinked with divinylbenzene (DVB). (Column 14, lines 50-56). Heikkila et al. discloses the use of Finex columns crosslinked with 5.5% DVB to separate sucrose, a disaccharide from trisaccharides and monosaccharides. (Columns 7 to 8, Example, 1, Table 1B, and Table 1C). The trisaccharides and monosaccharides in the feed solution was present as 2.8% and 0.6% weight of dry solid weight respectively. (Column 8, Table 1B). Heikkila et al. further discloses the use of Purolite PCR 651 with 5.5% DVB for purification of sucrose, without any other saccharides. (Example 5, Columns 12-13, Tables 5A and 5B). Heikkila et al. discloses molasses, starch hydrolysates and wood hydrolysates as suitable feed solution. (column 5, lines 15-25). As evidenced by Scott et al., wood hydrolysate contains the disaccharide cellobiose (Scott et al. column 2, lines 20-50). Heikkila et al. discloses the separation of monosaccharides, disaccharides and

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trisaccharides, specifically glucose, fructose, sorbitol and sucrose (column 5, lines 26-30). Heikkila et al. discloses a separation temperature of 80°C is disclosed (Example 2).

Heikkila et al. does not expressly disclose the use of a feed solution having a saccharide dimer content of 70-90 weight % or the ranges of trimer claimed herein. Heikkila et al. does not specifically disclose a crystallization step. Heikkila et al. does not specifically disclose the method comprising eluting said feed solution on a cation exchange resin of a degree of crosslinking of 2 to 4.5%.

Masuda et al. teaches a moving bed type fractionating method for the separation of maltose, a disaccharide, from a starch with disaccharide (maltose) content of 30-50% by weight resulting in maltose purity of 80% by weight. (Abstract; Column 16, lines 60-65). Matsuda further teaches that it is general practice to purify maltose product by crystallization. (Column 1, lines 45-50).

Catani et al. teaches the separation of sugars by conventional chromatographic techniques is known to those of ordinary skill in the art (column 12, lines 8-15). Catani et al. teaches a simulated moving bed technique using an "anionic exchange resin" such as the sodium salt of a styrene-divinyl benzene sulfonic acid resin which has a degree of crosslinking from 4 to 6% (column 12, lines 17-20). An "anionic exchange resin" exchanges the cation counterions of the anionic resin, which is to say an exchange resin that is anionic or an "anionic exchange resin" is synonymous with a "cation exchange resin" because anionic describes the resin and cation describes what is exchanged. Catani et al. teaches "When the degree of crosslinking of the resin is

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above 6%, the efficiency of separation decreases. When the degree of crosslinking of the resin is below 4%, the mechanical integrity of the resin is undesirable.” (column 12, lines 20-25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention disclosed by Heikkila et al. with the use of a feed solution with more than 65% weight % of saccharide dimer or the ranges of monomer/trimer claimed herein and the teaching of Catani et al. of the use an cation exchange resin with a degree of crosslinking from 4 to 6% and the teaching of Masuda et al. of the disaccharide maltose and a crystallization step. One of ordinary skill in the art would be motivated to choose the resin with 4% and 6% crosslinking because Catani et al. teaches “When the degree of crosslinking of the resin is above 6%, the efficiency of separation decreases. When the degree of crosslinking of the resin is below 4%, the mechanical integrity of the resin is undesirable.” (Catani et al. column 12, lines 20-25). One of ordinary skill in the art would have been motivated to use a cation exchange resin with crosslinking of 4% and an ion exchange resin of 6% crosslinking to separate disaccharides from a feed solution because Heikkila et al. discloses the use of multiple ion exchange resins to separate saccharide solutions. Furthermore, double purification using two different types of resins would have been within the grasp of one of ordinary skill in the art with a reasonable expectation of success to result in the invention as claimed. It would have been obvious to one of ordinary skill in the art to apply the known techniques of Masuda et al. to a known method ready for improvement to yield predictable results. With regard to the use of a feed solution having a saccharide dimer